

2. Contributions to our Knowledge of the Plankton of the Faeroe Channel.—No. II. By G. HERBERT FOWLER, B.A., Ph.D., Assistant Professor of Zoology, University College, London.

[Received March 29, 1897.]

The following notes form a continuation of the previous paper on this subject (see P. Z. S. 1896, p. 991):—

CONCHÆCIA MAXIMA (Brady & Norman).

Twenty-five specimens, apparently referable to this Ostracod, were obtained in deep-water hauls. It occurred in three hauls at depths between 480 and 220 fathoms, and in three hauls which began at depths greater than 300 fathoms and were finished at the surface; it did not occur in a single one of the twenty-two surface hauls (100 fathoms or less, to the surface).

The only other occurrences of this species are recorded by Brady and Norman<sup>1</sup> as "off Greenland in lat. 74° 49' N., long. 11° 30' W., in a depth of 350 fathoms, and by H.M.S. 'Triton' in 1882, lat. 60° 20' N., long. 7° 23' W., in 200 fathoms, cold area, Faroe Channel." Mr. John Murray, who supplied these specimens to Mr. Brady and Canon Norman, has kindly informed me that the Greenland specimens "were brought home by Mr. Gray in a Peterhead whaler a few years ago."

So far as the three records go, there can be little doubt that in *Conchæcia maxima* we have a true member of the cold Mesoplanktonic fauna. The lowest depth and temperatures at which it was captured on the 'Research' were<sup>2</sup>:—

Sta. 13 *g.*—465 to 335 fathoms; temp. 31° to 33° Fahr.

Sta. 19 *a.*—480 to 350 fathoms; temp. 46° to 47° Fahr.

TOMOPTERIS ONISCIFORMIS, Eschscholtz.

Vejdovský<sup>3</sup> recognizes three European species of *Tomopteris*:—*onisciformis* (Eschscholtz<sup>4</sup>), *vitrina* (Vejdovský<sup>3</sup>), and *scolopendra* (Keferstein<sup>5</sup>). His diagnostic characters, however, seem quite inadequate for sharp distinction, and fall in all probability within the limits of individual variation, excepting in the case of the "Flossenaugen," the remarkable structures which have been variously interpreted as eyes or as phosphorescent organs.

According to Vejdovský these are arranged as follows:—

*Vitrina*, Vej.—One on the notopodium, one on the neuropodium; pigment yellow; one lens.

<sup>1</sup> Sci. Trans. Roy. Dublin Society, (ii.) v. 687, pl. lxi. figs. 1–8.

<sup>2</sup> Cf. Proc. Zool. Soc. 1896, p. 993 note.

<sup>3</sup> Zeitschrift wiss. Zoologie, xxxi. p. 81.

<sup>4</sup> Isis, 1825, p. 735.

<sup>5</sup> Arch. Anat. Physiol., 1861, p. 360.

*Scolopendra*, Kef.—One on the neuropodium only; pigment dark red; two lenses.

*Onisciformis*, Esch.—Two on the notopodium, two on the neuropodium; pigment yellow; five lenses.

These seem good diagnostic characters, but are unfortunately not entirely justified.

Taking first the number and position of these organs, and accepting Vejdovský's and Keferstein's account of *vitrina* and *scolopendra* respectively, the alleged presence of two "Flossenaugen" on each half of the parapodium in *onisciformis* is stated by Vejdovský to have been observed by Carpenter and Claparède<sup>1</sup>, and by Leuckart and Pagenstecher<sup>2</sup>. A reference to the original memoirs shows, however, that the first-named authors describe and figure one only on the notopodium, one on the neuropodium; and that the German authors, describing a 2 mm. *onisciformis* under the name of *quadricornis*, describe and figure one only on the basal part of each parapodium. Busch<sup>3</sup> also, in describing young specimens, agrees with Leuckart and Pagenstecher. *Tomopteris onisciformis*, therefore, like *T. vetrina*, has apparently one "Flossenauge" on the notopodium, one on the neuropodium, or two on each parapodium; it has probably only one in young stages, and this only on certain parapodia.

Taking next the question of the pigment, its colour, yellow, dark red, or brown, can hardly be reckoned diagnostic. Lastly, with regard to the question of the lenses—these appear, according to Greef<sup>4</sup>, who worked on fresh material at the Canary Islands, to be artificial products of the preservation fluids. Almost certainly, judged by a comparison of the figures, the five lenses attributed by Vejdovský to Leuckart and Pagenstecher's *onisciformis* are the same things as his "Augen-drüse" cells, which appear to surround the pigment-cells in a surface view.

There seems, therefore, to be no real specific distinction between Vejdovský's *vitrina* and *onisciformis* (auctt.). In my specimens of *onisciformis* the basal joint of the second cirrhi (Borstencirrhien) was sometimes longer, sometimes shorter than the first parapodium, and the eye-lenses were single—thus breaking down two more of his diagnostic criteria.

It is possible, as Vejdovský suggests, that *T. scolopendra* (Kef.) may be separate from *T. onisciformis* (?=*Briaræa scolopendra*, Quoy and Gaimard<sup>5</sup>); but it is always difficult, often impossible, to make certain of the "Flossenaugen" in preserved material, and conceivably *scolopendra* may prove a Mediterranean variety of *onisciformis*.

The largest 'Research' specimen measured 45.5 mm. in length;

<sup>1</sup> Trans. Linnean Soc., xxiii. p. 59.

<sup>2</sup> Arch. Anat. Physiol., 1858, p. 588.

<sup>3</sup> Arch. Anat. Physiol., 1847, p. 180.

<sup>4</sup> Zeitschrift wiss. Zoologie, xxxii. p. 237.

<sup>5</sup> Ann. Sciences naturelles, x. p. 235.

the second cirrhi (Borstencirrhén) were only 33 mm. long in this specimen, but in smaller ones were often longer than the body. The fully developed parapodia were 20 in number; the undeveloped posterior part of the body carried eight rudimentary parapodia, and measured 9 mm. In the youngest specimens the parapodia were proportionately fewer than in the medium-sized specimens, and are again less crowded in the largest. Points like these, taken with the specific uncertainty already discussed, show how necessary is a renewed study of the genus on *living* material.

I have not found any record of a larger specimen than this, but my friend Mr. E. T. Browne informs me that he has taken a specimen about 55 mm. in length off Valentia.

As regards the horizontal distribution of the species, it is common in northern seas, but not apparently further north than the Faeroe Channel. Here it was captured by both the 'Knight Errant' and the 'Triton,' and Prof. M'Intosh<sup>1</sup> points out that it appears to have been procured from very varying depths; this agrees with my experience on the 'Research'; it was taken at<sup>2</sup> Sta. 13 *g*—465 to 335 fathoms, temp. 31° to 33° Fahr., and was also taken at the surface at a temperature of 54° F.

#### TRACHELOTEUTHIS RIISEI (Steenstrup).

I have found some difficulty in the determination of this species, owing probably to the fact that Steenstrup's original description<sup>3</sup> was of the briefest.

A specimen obtained in the Faeroe Channel during the cruise of H.M.S. 'Knight Errant' in 1880 was fully described by Hoyle among the 'Challenger' Cephalopoda<sup>4</sup>, but he expressed himself as uncertain of his determination.

The deciding characteristics of the only two species<sup>5</sup> known appear to be the following according to Carus<sup>6</sup> (founded on Hoyle and Weiss) and Steenstrup:—

	<i>riisei</i> .	<i>behnii</i> .	'Research' spec.
Fins .....	Rhomboid. C., S.	Rounded behind. C. Heart-shaped. S.	Rounded behind. Heart-shaped.
	= $\frac{1}{3}$ body length. C.	> $\frac{1}{3}$ body length. C. <sup>7</sup> = $\frac{1}{4}$ body length. S.	= $\frac{1}{3}$ body length.
Tentacles	=body length. C.	= $\frac{2}{3}$ body length. C.	=body length.
Arm 4 ...	= $\frac{2}{3}$ length of arms 2, 3. S.	= $\frac{1}{2}$ length of arms 2, 3. S.	= $\frac{2}{3}$ length of 2, 3.

While, then, the general dimensions of my specimen agree with

<sup>1</sup> 'Challenger' Rep. Zool., Annelida Polychæta, xii. p. 532.

<sup>2</sup> Cf. Proc. Zool. Soc. 1896, p. 993 note.

<sup>3</sup> Vidensk. Medd. Nat. Foren. Kjöbenhavn, (4) iii. p. 293.

<sup>4</sup> Chall. Rep. Zool. xvi. Cephalopoda, pp. 163-166, pl. xxviii. figs. 6-12.

<sup>5</sup> Since the above was in type, I find that a third species, *T. guernei*, has been described by Joubin ('Campagnes Scientifiques par S. A. le Prince de Monaco,' fasc. ix.), but it is not likely to be confounded with either of the other two.

<sup>6</sup> Prodróm. Faunæ Mediterr. ii. pp. 447, 448.

<sup>7</sup> "Plus quam  $\frac{1}{3}$  pallii æquantés." Surely a mistake!

those of *T. riisei*, the shape of the fin is markedly that of *T. behnii*; this is well brought out by Hoyle's figure, which shows a distinctly rhomboid fin.

A specimen of *T. behnii* was described by Weiss<sup>1</sup>, which agrees almost exactly with the diagnostic characters given above for that species.

The following table exhibits the dimensions of my specimens, the 'Knight Errant' specimen described by Hoyle, and the Messina specimen described by Weiss, expressed in percentages of mantle length:—

	'Research.'	'Knight Errant.'	Messina.
Length of mantle in mm.	23	32	21
Breadth of mantle . . . .	·38	·25	—
Length of fin . . . . .	·34	·40	·28
Breadth of fins . . . . .	·56	·59	·38
Length of arm 1 . . . .	·21	·24	·14
„ 2 . . . .	·56	·56	·33
„ 3 . . . .	·47	·46	·28
„ 4 . . . .	·34	·40	·19
Length of tentacle . . . .	·91	1·00	·61

So far as this goes it is fairly obvious that the 'Knight Errant' and 'Research' species are the same, and different from the Messina species; the dimensions further point to an accurate determination by Hoyle and Weiss of their respective species.

I have therefore assigned my specimen to *T. riisei*, although the shape of the tail-fin is distinctly that of the other species.

Dimensions in millimetres:—end of body to margin of mantle, 23; breadth of body, 9; length of fin, 8; breadth of conjoint fins, 13; arm i, 5; arm ii, 13; arm iii, 11; arm iv, 8; tentacle, 21.

The animal was of an absolutely glass-like transparency, except for the two staring black eyes and a black mass posteriorly (? ink-sac). When it had been killed, scattered chromatophores became more obvious, notably four, symmetrically placed on the dorsal surface of the head, and a line of smaller ones along the median dorsal line of the mantle; they were of a deep claret-colour.

As Hoyle<sup>2</sup> pointed out, and was corroborated by Jatta<sup>3</sup>, *Tracheloteuthis* is a member of the subfamily *Ommastrephini*; the latter author refuses, however, to accept the suggested identification of *Tracheloteuthis* with *Verrilliola*=*Entomopsis*, as the four species described under these two genera are members of the *Taonoteuthi*.

*Distribution*:—

(1) Faeroe Channel—60° 29' N., 8° 19' W., surface ('Knight Errant').

(2) Faeroe Channel—60° 2' N., 5° 49' W., 100 to 0 fathoms ('Research').

(3) Atlantic, Mediterranean (*Steenstrup*).

<sup>1</sup> Quart. Journ. Micr. Sci. xxix. pp. 75-96, pls. viii.-x.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Fauna e Flora Golf. Neapel.—I Cefalopodi (Sistematica), p. 112.